

Exploring P LuMA

PLuMA (Planning for Landscape Management and Adaptation) allows you to explore the potential impact of climate change on bird species in northwest Mexico and the southwest United States and download GIS layers for areas of interest. The following instructions will introduce you to the basic functionality of the site.

1. **Drop Down Menus** - On the top edge of the map you'll see a box with four different drop-down menus.
 - a. *Habitat Menu* - This lists different general habitat types within the study area. This serves as a filter the Species Menu, which will then show species associated with the selected habitat type. You can select just one habitat, or all of them.
 - b. *Species Menu* - This lists the different individual species that are associated with the selected habitat type.
 - c. *Climate Menu* - This lists historic or future climate for five different future climate models averaged for 2041-2060. These are the basis for the climate variables used to build our bird distribution models.
 - d. *Time Period Menu* - This lists different breeding periods in 4 month intervals: January-April, May-August, September-December.
2. **Pan and Zoom**. Use your mouse or the pan and zoom tools on the left side of the map to scroll around the map and zoom in to any place that interests you.
3. **Locking in an area of interest**. You can lock in an extent and area of interest that will persist between your browser sessions and when switching between species or climates. Any data you download will be for the selected area only. Lock in an area by holding down the shift key. Then left click on your mouse, draw a square on the map, and release. Notice that a green dashed box appears. You can zoom back to the entire study area by clicking on the *Recenter map* link along the top left of the map.
4. **Download Data** - Once you've selected the map and area you are interested in, click on the Download Data button to download a zipped file of that map for your area of interest. This layer is in geotiff format and can be further explored within a geographic information system.
5. **Range and Breeding Period Map** - What seasonal time period should be used? To the right of the map you'll notice a static map. The non-brown area in the map is the area modeled. The hashed shadow represents the current breeding range for the selected species (available via [BirdLife International](#)). Each color shade indicates an approximate

breeding time window for the species within each of four regions indicated by the dark solid lines. We based these regions on [Bird Conservation Regions](#) and grouped them together based on expert opinion. Using these allowed us to vary climate and time periods by region for each species based on when they were most likely to be breeding in a given region. Use the breeding period legend below the static map to look up which breeding period was used for each region.

- Model Variable Contribution.** To the right of the map you'll see a list of climate and habitat variables followed by a percentage value. This represents the percent contribution of each variable to the species model. A higher percent indicates a higher importance to the species model.
- Layer Opacity.** Try changing the *Opacity* on the left side of the map to better view the base layers underneath the bird model layer.
- Base Layers.** On the right side of the map, clicking on the “+” symbol will show a list of different base layer options that you can turn on and off.

